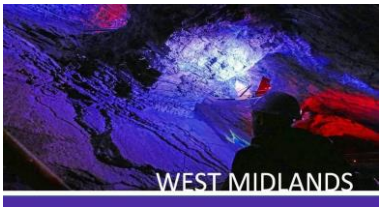
The Geological Society
serving science & profession



East West Rail Stage 2 (Bicester-Bletchley) Engineering Geology and Geotechnics

Kate Kendall (Engineering Geologist, AtkinsRéalis)
Simon Miles (Chief Geotechnical Engineer, AtkinsRéalis)

12th March 2024 | Mott MacDonald, 10 Livery St, Birmingham B3 3NU / Zoom Video Conference | 6:00pm refreshments and networking | 6:30pm start.

Abstract:

Kate Kendall and Simon Miles have supported in the delivery of the East West Rail (EWR) Phase 2 project, as part of the East West Rail Alliance. Kate scoped and oversaw the ground investigations and subsequent track bed design through the Governance for Railway Investment Projects (GRIP) stages 4 & 5. When construction began in GRIP 6, Kate then moved to site as a Site Engineer. Simon joined the project as Chief Geotechnical Engineer to principally oversee the delivery of the main earthworks activities.

The East West Rail Alliance (comprising of AtkinsRéalis, Laing O'Rourke, Network Rail and VolkerRail.) was appointed to rehabilitate the mothballed railway between Gavray Junction (Bicester) and Denbigh Hall Junction (Bletchley). Construction started in 2019 with the enabling works, followed by the main civils works in 2020 which was completed this year. The line is expected to enter into service in 2025.
Kate will take us through the regional context of the geology, as it affected the design and construction of the revitalised railway corridor. She will highlight how the initial ground model was built up from the sources available and how this influenced the development of the civils works design. Kate will also describe how the geological materials used in the original construction of the railway influenced the decisions made about how the new railway would be rehabilitated for its new use and to ensure its longevity for decades to come.

Figure 1 - Glacial fluvial deposits over Oxford Clay within a cutting slope at Winslow

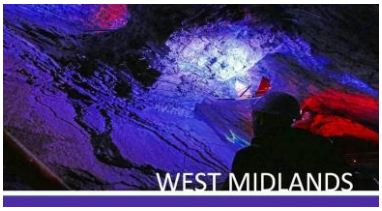
Rehabilitating a railway, rather than starting from scratch, poses its own challenges. Simon will explain how the existing earthworks were assessed, almost chain by chain, to understand both the stability of the earthworks and the fill material used in the embankments. Modern standards could not be applied, so the impact of the new works was assessed on a 'no-worsening' basis, on the basic understanding that the existing earthworks had already proved themselves capable of supporting a railway over more than a century in service. Where conditions have changed then engineering interventions were applied to bring the railway up to modern standards.

Much of these interventions were driven by a project decision to provide a standard width cess walking route throughout, necessitating the widening of embankment crests, and degraded cutting slopes requiring regrading. New bridges were also provided to replace level crossings (5 road bridges and 10 footbridges), plus a partial rebuild of the Bletchley Flyover, and one box culvert. In addition to these, several challenges became known during the construction period which required additional engineering interventions. These included a seepage issue in a cut face, a collapsing embankment, a bridge in structural distress and a bridge experiencing excessive settlement. There were also early concerns raised over the constructability of the track bed design which had to be overcome.

This presentation will show how geology has been an important consideration through all stages of the project from scoping the first ground investigation through to the construction. Engineering geologists formed an integral part of the site delivery team during construction to ensure that there was an accurate translation of the earthworks and track bed design into construction, identifying issues early on and finding solutions.

Figure 2 - Slope failure within existing historic embankment during construction works

The Geological Society
serving science & profession



About the Speakers:

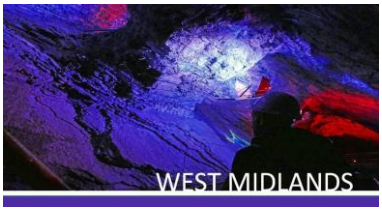
Kate Kendall

Kate is an Engineering Geologist at AtkinsRéalis and a Fellow of the Geological Society, currently working towards chartership. She joined AtkinsRéalis as a graduate in 2016 following the completion of an MSci in Geology at the University of Birmingham. Kate has worked on a variety of projects during her career, most notably in the rail sector. Kate has also completed a part-time MSc in Geotechnical Engineering, graduating in 2022. Combining geology and geotechnics has allowed Kate to develop her skills understanding how the underlying ground influences the engineering decisions taken within both design and construction.

Kate's work on EWR began when she was a graduate in 2016. At this time she was involved with scoping the ground investigation, followed by becoming part of the trackbed design team. In 2019 Kate took over as ground investigation supervisor. During her time supervising the GI, Kate built up a relationship with the Alliance civils team who were starting the project enabling works. As a result of this, Kate was then asked to join the site delivery team as a Site Engineer in 2020. Her work started as supervising the construction of the temporary compounds and haul roads and managing material movements. She was then promoted to Section Engineer and lead a team of engineers and managed sub-contractors delivering the construction of the earthworks, trackbed and drainage.

The Geological Society

serving science & profession



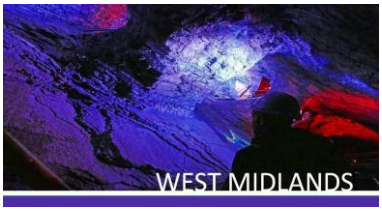
Simon Miles

Simon is a Chief Geotechnical Engineer at AtkinsRéalis, a Chartered Engineer and a Fellow of both the Institution of Civil Engineers and of the Geological Society of London. Simon's experience majors in large infrastructure projects, predominantly in the United Kingdom. Simon was asked to join the Alliance in March 2021 'to de-risk the delivery of the earthworks packages and ensure that they are delivered within one earthworks season', as it was imperative to the success of the entire project that this was achieved. He subsequently assumed further responsibilities, taking over the Alliance Responsible Engineer (ARE) role for Offline Earthworks and Foundations when the incumbent left the project, and becoming the de-facto leader of the geotechnical engineering team within the construction supporting Site Design Team, and mentor to the many Atkins Engineering Geologists seconded in to the Delivery Teams as Section Engineers.

As Chief Geotechnical Engineer to the Alliance he became responsible for all geotechnical design aspects of the project delivery and oversaw several important design interventions necessary to solve emerging issues with the delivery of the project which would otherwise have threatened the programme. Some of these will be discussed in the presentation. He also de-risked the earthwork hand-back process (into Network Rail maintenance) by undertaking to complete the initial earthworks inspections in-house, using the resources already available to the project, and so protect the programme. The alternative would have been for NR's contractors to do it as part of their annual work bank, which could have delayed the process by many months and taken it out of the control of the Alliance.

The Geological Society

serving science & profession



Forthcoming Talks:

Date	Title	Speaker	Venue
Tuesday 12th March 2024 • Refreshments from 6:00pm Presentation at 6:30pm	East West Rail Stage 2 (Bicester-Bletchley) Engineering Geology and Geotechnics	Kate Kendall and Simon Miles, AtkinsRéalis	Mott MacDonald, Birmingham and via Zoom video conference
Tuesday 9th April 2024 • Refreshments from 6:00pm Presentation at 6:30pm	Periglacial geohazards at the Colne Valley South Embankment	Guillermo Mondejar, Jacobs	Mott MacDonald, Birmingham and via Zoom video conference
Tuesday 14th May 2024 • Refreshments from 6:00pm Presentation at 6:30pm	*Mid-Pleistocene Deposits on HS2 (Title TBC)*	Gerard McCardle, Systra	Mott MacDonald, Birmingham and via Zoom video conference
Tuesday 11th June 2024 • Refreshments from 6:00pm Presentation at 6:30pm	*Provisional:* *Contaminated Land / hydrogeology (Title TBC)*	Dan Welch, AtkinsRéalis	Mott MacDonald, Birmingham and via Zoom video conference
Tuesday 12th March 2024 • Refreshments from 6:00pm Presentation at 6:30pm	East West Rail Stage 2 (Bicester-Bletchley) Engineering Geology and Geotechnics	Kate Kendall and Simon Miles, AtkinsRéalis	Mott MacDonald, Birmingham and via Zoom video conference
Tuesday 9th April 2024 • Refreshments from 6:00pm Presentation at 6:30pm	Periglacial geohazards at the Colne Valley South Embankment	Guillermo Mondejar, Jacobs	Mott MacDonald, Birmingham and via Zoom video conference

The WMRG is constantly on the lookout for fascinating talks. If you would like to present, know someone who is willing, or would like to request a subject please contact the WMRG committee (details below) and we will try our very best to accommodate your requests.

Contact:

For all enquiries regarding the West Midlands Regional Group and events please contact us using the details below.

e-mail
Get in touch
geolsoc_wmrg@live.co.uk

www
Find us on the web
www.geolsoc.org.uk/wmrg

Connect on LinkedIn
WMRG ID: 4315899

Join our Facebook Group
WMRG ID:/330578153706037

Follow us on Twitter
@wmidsgeolsoc

Geological Society, Burlington House, Piccadilly, London, W1J 0BG
Tel: +44 (0)20 7434 9944 Fax: +44 (0)20 7439 8975 Email: enquiries@geolsoc.org.uk Web: www.geolsoc.org.uk
Registered Charity No. 210161